

The relationship between research and teaching in higher education

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First may I say what an honour it is to be asked to speak to la reunión del proyecto Innova-Cesal in Lisbon today. This is an exciting project in itself, with its focus on understanding and in taking forward practice in higher education teaching. It is also a pleasure to engage with the intellectual concerns of colleagues in higher education in Latin America. Personally, my interest in Latin American culture goes back to my own university days where my old-fashioned tutors at Oxford insisted that I read *English* literature – not only literature written in English, but written in England by English nationals. Secretly, because I had studied Spanish to very elementary levels in school, I wanted to defy my lecturers and read the literature of the Americas. And so I read Borges, Octavio Paz, Carlos Fuentes, Márquez, and Pablo Neruda in the original Spanish, with my English translation beside me, enjoying the qualities of imagination, political radicalism and sheer verve in the use of language that these writers offered. Along with the music of Villa-Lobos or Carlos Santana, and the dance and football of Latin America, this was an irresistible combination for me.

In today's talk, I want to focus on aspects of the relationship of research to teaching in higher education: aspects that we have in common between Europe, North America and Central and South America. The main parts of my talk will look at:

1. the nature of research
2. the relationship between research and learning
3. the relationship between learning and teaching
4. efforts to provide a better relationship between research and teaching
5. some reflections on the future of these relationships

In the course of the talk, I will draw on some of my own research and some current projects for illustrative purposes.

The nature of research

Research is broadly defined as the following in the UK:

Research and experimental development comprise creative work undertaken on a systematic basis to increase the stock of knowledge...and the use of this stock of knowledge to devise new applications.

It covers three activities: basic research, applied research, and experimental development. Basic research is experimental or theoretical work undertaken

primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. Applied research is also original investigation undertaken to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. Experimental development is systematic work, drawing on existing knowledge gained from research and/or practical experience, that is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving those already produced or installed. (OECD 1993)

This is the so-called 'Frascati' definition, used for a succession of research assessment exercises by government of higher education output and infrastructure in research over the last seventeen years. It seems to be a fairly comprehensive, workable definition. It emphasizes three clear, but interrelated, types of research activity. More recently, the aspect of research which we could call 'scholarship' has been added – as in, for instance, the editing of a new edition of the work of Cervantes or Shakespeare. I would like to add a gloss on these definitions of research, because I think a key element is missing from these official versions. In the eighteenth century, research also meant, as far as a musical composition was concerned, 'the seeking of harmony, which once found, is used in the piece to be played afterwards'. This is an interesting and valuable definition of research, because it provides a *reason* for research: the seeking of *harmony*, or, we might say more generally, of pattern in phenomena where previously no pattern has been identified. Rather than 'an addition to the sum of knowledge', research thus also becomes the pursuit of pattern and order, the seeking out of some frame that will bring meaning – new meaning – to phenomena. Such a definition is close to 'theoretical work to acquire new knowledge of the underlying foundation of phenomena', but the difference is that the seeking of pattern can apply to both theory and to empirical data. I can see that my own work fits into this eighteenth century definition, because it involves configuring and reconfiguring the discourses within a particular field.

(By the way, another eighteenth century definition of research – 'to seek a partner in love and/or marriage' – is not one we will pursue here.)

I emphasize the seeking for pattern, for new frames of meaning in the definition of research, because such a richer definition suits my argument: that research and learning are closely related. Before I go on to make this connection clear, some further points about research...

Research is *systematic* to some degree: that point seems easy to accept. Also the four kinds of research in the Frascati definition now seem uncontentious. It is good to see that experimental development and scholarship are recognized, as well as basic ('blue skies') and applied research. We know that in the higher education sector, there is pressure on academics to research and teach, as well as to engage in income-generating activities like consultancy. In large institutions, there tends to be a separation of the research from the teaching, simply because the institution is large enough to accommodate both activities and one (teaching) usually subsidizes the other (research), even though research has higher status and is more closely linked to reputation and promotion prospects. In smaller institutions (like the University of York where I worked for seven years), the relationship

between research and teaching was closer because all lecturers were expected to research *and* teach. This expectation is demanding on lecturers' time, but it makes for an excellent climate for research and teaching, and undergraduate as well as postgraduate students appear to enjoy having access to current research via their lecturers. In larger universities, the distance between research and researchers on the one hand, and teaching and lecturers on the other, can be much greater.

But I am getting ahead of myself, and now wish to turn to the relationship between research and *learning* in higher education. I see learning as the bridge between research and teaching.

The relationship between research and learning

Research seems to me like cutting-edge learning. It is not about going over the same ground. Rather, it is learning that is systematic to some degree, and that involves two key aspects of learning: that it is an 'effect of community' and that it is transformative. To briefly explain these two concepts. First, in the early 1990s, the American social psychologist Barbara Rogoff (1992), working in the Vygotskian tradition, coined the phrase 'learning is an effect of community'. By this she meant that learning always emerges, and is sometimes a direct result of engagement with a community: you learn the values, social knowledge and processes by immersing yourself in a community and being an 'apprentice' to that community (her book is called *Apprenticeship in Thinking*). I would wish to extend her definition to include electronic communities as well as real-world communities like schools, classrooms (at the formal end of the spectrum) and clubs, families, the street, networks of friends (at the more informal end of that spectrum). It seems to me that one of the key challenges for a learner in higher education (and indeed at school level) is to how to navigate those different communities, how to move between them and how to make the most of their contiguities. For me, then, learning is partly an effect of *communities* and the relationship between them.

Second, learning is transformative. It is not just a matter of learning by rote unless that learning transforms the mind and/or feelings and/or soul of the learner. New learning does not simply add new material to the brain; it changes the wiring or synaptic links in the brain by generating new connections, new understandings, new possibilities. This transformation, however small (for example the learning and use of a new word) or large (a conversion to a new faith, understanding the connection between death and life) transforms not only the individual learner, but has social and political implications too. That learner becomes a changed person, a different agent for change within his or her social and intellectual networks.

So, learning is not just the acquisition of knowledge but is 'an effect of communities' in which we operate and is transformative. What about its processes and its relationship with research? I have already suggested that research is cutting-edge learning. I can best illustrate this connection via the ten oxherding pictures, famous within Zen philosophy as depicting the path to enlightenment and represented in several versions. The one I will show

here is by Tomikichiro Tokuriki, a woodblock artist from Kyoto, Japan. You need to read this sequence from left to right.



一
尋牛



二
見跡



三
見牛



四
得牛



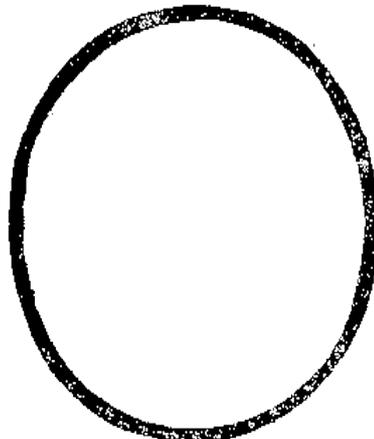
五
牧牛



六
騎牛
歸家



七
忘人
存牛



八
人忘
牛



九
返本
還源



昭和辛卯夏
空齋吉郎
畫並刻摺

十
入
手

In the first stage of learning-as-research, the boy wanders in the forest/nature without any sense of direction, oblivious, as it were, towards learning. In the second stage he sees the

tracks of an animal, even though he may not realize that these tracks will lead to knowledge and enlightenment. Third, he sees that the tracks indeed lead to a bull. Fourth, he hunts and captures the bull, symbolizing the power of nature and the identification and harnessing of knowledge. And in the fifth stage, he is seen leading the bull, having gained control of it. At this stage, half way through the process of learning-as-research and on the path to enlightenment, he has moved from a position of unawareness to one in which he has 'accessed, selected and captured' information for local and individual aims.

In the sixth woodcut, he is seen riding the bull on the way home while playing a flute. He thus has both command of the forces of nature and can also discourse in the higher realms of aesthetic pleasure and the expression of the soul in music. In the seventh stage, the bull has disappeared. It is no longer of immediate use, because taming it has enabled him to reach a higher state of being and to contemplate, with the help of meditation, his lot in the world. He is pictured sitting outside his modest house, reflecting and meditating on his journey so far. The eighth woodcut simply depicts an empty circle: this is the state of enlightenment, beyond the world and its material objects, beyond self, and beyond the transformational process of taming the forces of nature and transmuting them into a distillation of 'nothingness'. But that is not the end of the path to enlightenment or learning-as-research, because the ninth frame shows 'nature' again, in seemingly harmonic state and without the presence of the boy or the bull. It is as if he has been subsumed within nature – a very different state from the unaware wandering through nature that we saw in the first frame. Finally, the boy appears again in the tenth woodcut, exchanging goods in the marketplace, engaging with the social world but in a different state from that in which he started the journey. How he is at one with himself, no longer separate from the world of nature. There is thus more to the stages of research-as-learning than transformation, especially in the latter half of the journey. The transformation brings about a higher state of knowledge (wisdom, enlightenment) that is morally and socially integrative of the solitary enquiring mind/soul.

I wish to suggest that this Zen sequence is entirely applicable not only to the research process in higher education, but also to the process of learning in higher education, when the onus is on the independent learner to find his or her way through a field a knowledge or, more modestly, in attempting to gain command of a topic. In summary, it is a process of identification of a path, accessing and capturing the knowledge or force, taming and 'getting on top of it', reflecting on it, reaching understanding beyond self and the object of learning, and then – crucially – bring that knowledge and new self-awareness back into the world.

Every research student, every undergraduate and indeed every child I have shown this sequence recognizes that it depicts both learning and the research process. It reinforces, for me, the close connection between research and learning – a connection that is often not made in higher education.

The relationship between learning and teaching

If you accept my argument that research will somehow be linked to teaching, the bridge will be learning. We must now take the next step: to identify the connection between learning and teaching, but acknowledge at the outset that what is taught is not always what is learnt. I know this from a conversation with my daughter, Grace, when she was three years old. She attended a pre-school class in a house near our home. I collected her one day, and asked the teacher 'What have you been teaching today?'. The answer was 'Fractions'. I thought to myself what an advanced concept to teach three year olds, and I was suitably impressed. Even more so when the teacher said she taught fractions by making sandwiches with the children, then cutting them in half, then in quarters. As they made and then ate the sandwiches, they talked about halves and quarters. What a brilliant piece of teaching, I thought. On the way home with Grace, I asked her what she had learnt. 'I have learnt' she said, 'that I like butter'.

In higher education now, the word for teaching is learning. In other words, learning is what we should focus on, using teaching to elicit and to facilitate better learning. But learning is not just personalized, individual learning; it is induction into a discipline. In the USA, this takes place in the third and fourth year of undergraduate study when the student chooses a 'major'. In the UK, it takes place from the start of the undergraduate degree (and, indeed, before than in the last years of schooling in advanced courses). Being inducted into a discipline means not only learning the content and concepts of that discipline, but also learning the discourses, the argumentational conventions and the surface conventions (referencing etc).

Inducting students successfully into a discipline or disciplines, and leading them through to successful completion of a three or four year degree (the Latin 'educere' means 'to draw out, to lead') requires the best teaching possible. Such teaching is sensitive to learning needs and preferences, and to the particularities of a discipline as well as to generic pedagogical and argumentational techniques. Research undertaken at the University of York (Andrews 2009) suggests that a balance between generic and discipline-specific argument skills is the best way to help students attain the highest scores in their degree. Let me explain this research, and its impact on learning and teaching in more detail.

A key capability in undertaking a first degree, or Masters or doctoral degree in higher education is the ability to argue. The difference between those students who leave with high scoring degrees, or passes at Masters and doctoral level on the one hand; and those students who do not, is not only how well they know their subject, but how well they argue. Argumentation provides structure, critical insight, a sceptical approach and the originality required at the higher levels.

Generically, argumentation includes the ability to structure and re-structure compositions; to move from oral argument to written argument; to synthesize a range of different voices into your own 'positioned' voice; to demonstrate independent critical thought; to provide evidence, where appropriate; to question your own as well as others' assumptions; and to reveal, where necessary, the warrants and backing (Toulmin 1958) that enable your argument to be sound. It needs to be distinguished from exposition, which simply re-

presents other people's ideas; from description; and from narratives which are not woven with an argument of some sort.

The research at York looked at argumentation in three disciplines – History, Biology and Electrical Engineering – to see if there were differences in the way students argued, and at how lecturers could help them to improve their performance in this regard (and thus overall). In brief, the results were that argumentation, as well as have commonalities across the disciplines, is interpreted differently and has different functions in these three disciplines (and in others).

Historians see argument as central to the discipline – some even say 'it is the discipline'. Lecturers encourage first year undergraduate students to discuss in small groups, to question assumptions, to dig down from tertiary to secondary to primary sources and thus re-investigate the evidence and its relationship to propositions/claims in the field. Much work is spent on translating from oral discussion to written representation, with detailed feedback from lecturers in order to help students to focus their thoughts. One of the most arresting phrases from the research is that history undergraduates are encouraged to 'drill down at the points of dispute' in the field.

Biology students and lecturers tend to distrust the word 'argument' (the general term) and argumentation (the technical one). They see it as 'too high' a term for their work in proving and disproving theses, in undertaking empirical work, and in trying to understand a vast body of 'content' in the field. One lecturer commented that he did not think his students could argue at undergraduate level because they did not know enough about the subject to do so. They also tend to see argument as a negative term, through its associations with everyday disputes. Perhaps there is something of the Anglo-Saxon anxiety about argument in this attitude: they do not see it as a natural form of discourse, or one that will help them break through to higher ground. I am not sure if, in Latin America, argument has the same connotations as it has in the Mediterranean countries or in Jewish culture where it is acknowledged as inevitable, dangerous but – in most cases – positive.

Electrical engineering students, on the other hand, understand the value of argument. They feel they do not use it so much in the design of circuits and in the solving of problems in the field (though clearly the weighing up of options in design choices and in testing prototypes require inner argumentation), but that it is used extensively when designs have to be justified to an audience. In other words, they see it as operating in words, not in visual or spatial or mathematical designs. For example, a presentation to fellow students, researchers and lecturers, or (in the commercial world) to prospective buyers of a new electrical solution, will require argumentation (which they see, as Aristotle did, as closely allied to the function of *persuasion*).

Our conclusions in the research project were that undergraduate students needed generic training in argumentation, but also discipline-specific training which went further than mere surface guidance as to how to write essays or how to give presentations. More fundamentally, the discipline-specific training required an understanding of the epistemological nature of each subject or discipline, and the way such 'backing' influenced the 'warrants' or means by which claims and propositions could be linked to evidence. The

implications are clear for postgraduate and research students too – and also, it is important to add, for lecturers. The assumptions lecturers make about their disciplines are not always understood by their students. The research suggested that lecturers should, from time to time (and certainly in the first year of study) reveal the epistemological underpinning of their disciplines, and discuss with students what makes a successful argument.

By citing this research, I hope to have made clear the connection between research, learning and teaching. As an interim summary, I wish to suggest that i) research is cutting-edge learning, ii) learning and teaching are reciprocally related, but there is no guarantee that teaching is always transformed into learning, and iii) lecturers need to reveal the hidden structures and assumptions of their disciplines in order to give students the maximum chance to succeed.

A better relationship between research, learning and teaching

About ten years ago, the British government decided that educational reform, as well as many others areas of public reform, needed to be evidence-based or at least informed by evidence. As far as the topic of today's talk is concerned, that meant that teaching and learning in schools and universities must be informed by evidence. As a result, a number of different sources of information via electronic portals have been set up to give lecturers, teachers and students access to a wide range of research in the education field.

[slide of urls:

Teacher Training Resource Bank: www.ttrb.ac.uk

Current Educational Research in the UK (CERUK): www.ceruk.ac.uk

Education Evidence Portal (EEP): www.eep.ac.uk

Evidence for Policy and Practice Information and Coordinating Centre (EPPI-Centre):
www.eppi.ioe.ac.uk

Institute for Effective Education (IEE): www.york.ac.uk/iee

Evidence Net: www.heacademy.ac.uk/evidencenet]

Of these, the most relevant for Innova-Cesal would probably be EvidenceNet, as it is run by the Higher Education Academy expressly to inform teaching in higher education.

Part of the changing relationship between research and teaching/learning was the need for syntheses of existing research to ensure that research was not repeated unnecessarily, and that it answered questions that were set by teachers, lecturers and students. For example, one of the systematic reviews and syntheses of research literature that I undertook with

colleagues tried to answer the question ‘What is the impact of new technologies on literacy education?’. This question was not set by myself and the research team, but by a lecturer/teacher. She said she could not find the answer to that question. A systematic review is undertaken by a team that preferably includes practitioners as well as researchers, which sets a clear research question and which defines the scope of its review. It can define, for example, whether it looks at research published in Spanish and/or English; whether that research is published from, say, the year 2000 onwards – or earlier or later; whether the research will concentrate on undergraduate education and/or on postgraduate; and what kinds of research design studies will be included. It is a good approach, and is probably the most reliable way of determining what research already exists in the field, and (once synthesized) what it says. (As it happens, that particular research study on the impact of new technologies on literacy learning in first and second languages concluded, in the end, that there were many gaps in the field and that the research question was wrong. New technologies do not have a simple causal effect on literacy learning; rather, they have a reciprocal, co-evolutionary relationship.)

One of the most important functions of systematic reviews of research is that they reveal gaps in the field. These gaps are where further research is needed and where, as lecturers, we need to say to our students that we don’t know the answers, and where disputes take place in our respective fields.

At present, in the UK, there is a move towards bringing together several of these sources of research evidence. There are three dimensions to such a move. One is to provide a single portal or point of entry to the various websites to enable the user (the student, the teacher, the lecturer, the researcher, the policy-maker) to ask questions and be led to the best available source of evidence. Another is to seek a degree of convergence between the different websites in order to provide a more coordinated service for users – and that includes international users of research evidence. A third possibility is to bid to the European Union for funds to undertake further development of the service across Europe, and in collaboration with partners worldwide. Perhaps el proyecto Innova-Cesal would like to be involved, especially from the perspective of research that underpins the education of profesores in higher education?

Some reflections on the future of the relationship between research and teaching

If the ‘objetivo general’ of Innova-Cesal is “desarrollar, experimentar y sistematizar estrategias para la transformación de la educación superior en América Latina sobre los propósitos de la formación, la práctica pedagógica, la estructura curricular y la formación de profesores” what could a better relationship between research and teaching offer in helping to meet that objective? And what else is needed, structurally, to ensure such a relationship transforms practice, curricula and personal development and training for profesores?

Changing and improving teaching is essential if we are to engage learners. I suggest, however, that it is not generic training courses in the pedagogies of higher education, in argumentation or, say, in e-learning techniques that are going to inspire university lecturers

to change their practices or improve their practices. The basis of lecturers' commitment to teaching in higher education is their intellectual curiosity and passion for a subject, a field of enquiry or a discipline. We must start there, and build on the lecturers' desire to learn within their chosen field.

That means that lecturers need to be more aware of the epistemology of their subject or discipline. In other words, what are the frameworks and characteristics of biology or sociology, as a discipline? When does a 'subject' (the common term for a specific field at school level) become a 'discipline' and what are its defining characteristics? Is the 'discipline' in fact a discipline, or is a multi-disciplinary 'field of enquiry', like educational studies? How does the discipline or field of enquiry progress?

Next, lecturers need to be aware of the discourses within their 'discipline' (I use the term 'discipline' now to simplify discussion of the next stages). These are the communication conventions via which the discipline operates. In particular, in the twenty-first century, what degree of multimodal awareness is there about how a discipline presents itself, and how it is mediated to students by lecturers (see Kress 2010)? What impact do new digital technologies and other media have on the dynamics of communication within the discipline (see Haythornthwaite and Andrews, forthcoming)? What degree of dialogue is there between lecturers and students about knowledge? And, perhaps most importantly for students, what modes and forms of assessment are considered valid within the discipline?

Thirdly, as suggested earlier in the talk, how do argumentation and criticality operate within the discipline?

Lastly, what are the surface conventions within the discipline that students have to follow (e.g. particular formats for the 'essay' or report, referencing conventions) and which are often the subject of guidance within a department at a university...and which are sometimes all that is offered the student as he/she tries to find his or her way to successful passage through the gatekeeping functions of the university?

Once these discipline-based issues are understood and shared with students, generic courses in e-learning, argumentation and the use of research evidence in teaching in higher education can be deployed. There is much to be learnt, not only generically about these topics and essential aspects of teaching in higher education, but by comparing practice, values and theories with those lecturers from other disciplines. Ultimately, the research with which I have been involved in higher education teaching has suggested that a balance is needed between discipline-specific training and awareness-building on the one hand; and generic expertise in linking research to teaching, and in pedagogical expertise itself, on the other.

I hope that these thoughts are of some help in focusing our attention of the relationship between research and learning, between learning and teaching, and lastly between research and teaching in higher education. It is a fascinating triangle, and in my view each of the corners of the triangle benefits most when the relationship is an equilateral one.

I wish the Innova-Cesal project every success. I hope to continue my involvement with it in future, and look forward to more informal discussions with you, in my very poor Spanish or in English. But first, I will be happy to try to answer any questions that you may have.

Thank you.

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Acknowledgements

I wish to thank Josh Booth and Fernanda Bates for their help in translating this paper into Spanish.